CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

CITY OF CAPE TOWN
ENVIRONMENTAL HEALTH SPECIALISED SERVICES
AIR QUALITY MANAGEMENT

APPLICATION FORM FOR ATMOSPHERIC EMISSION LICENCE / PROVISIONAL ATMOSPHERIC EMISSION LICENCE IN TERMS OF CHAPTER 5 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004 (ACT NO. 39 OF 2004)

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Air Quality Management
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Name of Enterprise: Lucky Star Hout Bay

Declaration of accuracy of information provided:

Application for an atmospheric emission licence / provisional atmospheric emission licence as envisaged in chapter 5 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).

I, Titania Stefanus Zincke [*delegated by the Accounting Officer*], declare that the information provided in this application or attached to the application is, to the best of my knowledge, in all respects factually true and correct. I am aware that the supply of false or misleading information in the application form is a criminal offence in terms of section 51(1)(f) of the Act.

Signed at Cape Town on this 11 th day of July 2017

SIGNATURE

Environmental and Social Risk Director
CAPACITY OF SIGNATORY

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NB: PLEASE COMPLETE ALL SECTIONS. KINDLY MARK WITH AN X IN SPACES WHERE APPLICABLE. IF THE SPACE PROVIDED IS INSUFFICIENT, THE REQUIRED INFORMATION MAY BE SUBMITTED IN THE FORM OF A MEMORANDUM. ATTACH REQUIRED MAPS AND SKETCHES. GRAPHICS MUST BE CLEAR, LABELED AND, WHERE APPLICABLE.

1 TYPE OF APPLICATION

	New Application		Transfer		NEMAQA Section 22A rectification application
	Renewal	X	Variation/Amendment/Review	X	

Current Atmospheric Emission Licence Number:	WCCT059

2 ENTERPRISE INFORMATION

Enterprise Name	Lucky Star Limited
Trading As	Lucky Star Hout Bay
Type of Enterprise, e.g. Company/Close Corporation/Trust, etc	Company
Company/Close Corporation/Trust Registration Number (Registration Numbers if Joint Venture)	1946/022718/06
VAT registration number	4030122503
Business partner number	1001749208
Registered Address	9th Floor, Oceana House 25 Jan Smuts Avenue Foreshore Cape Town 8000
Postal Address	P.O. Box 26803 Hout Bay 7872
Telephone Number (General)	021 791 8000
Fax Number (General)	021 790 8757
Industry Type/Nature of Trade	Fish Processing
Land Use Zoning as per Town Planning Scheme	Industrial

Land Use Rights if outside Town Planning Scheme	The plant was strategically positioned according to a report done by a committee appointed to investigate the ideal locations for the South African fishmeal factories in 1959
Responsible Person Name or Emission Control Officer (where appointed)	Olwethu Mlaza
Telephone Number	021 791 8000
Cell Phone Number	082 567 7553
Fax Number	021 790 8757
E-mail Address	OlwethuM@luckystar.co.za
After Hours Contact Details	082 567 7553

3 SITUATION AND EXTENT OF PLANT

3.1 Location and extent of plant

Physical Address of the Plant	Lucky Star Hout Bay Fishmeal Factory, Harbour Road, Hout Bay
Description of Site (Where No Street Address)	Lot 14
Coordinates of Approximate Center of Operations	North-south:-32°3'11.74" East-west:18°20'44.47"
Extent (km²)	0.005985 km²
Elevation Above Mean Sea Level (m)	2m
Province	Western Province
Metropolitan/District Municipality	City of Cape Town
Local Municipality	City of Cape Town
Designated Priority Area	N/A

3.2 Description of surrounding land use (within 5 km radius)

Provide a description of the surrounding land use within a 5 km radius, specifically noting the names and proximity of residential and commercial areas in relation to the site of the works.

The area around the Lucky Star Hout Bay site is coastal, mountainous, covered with grass and sparse bush. There is not any significant tree growth in the area.

The following nearby locations are relevant:

- Residential village about 1 km southwest.
- Central business district 2 km northwest.
- Mountain about 0.6 km southwest.
- Atlantic Ocean adjacent to the east.
- Sensitive receptors:

- Sentinel Intermediate school 150 m west, Hout Bay High School 150 m northwest, Hout Bay Clinic 2.8 km northeast.

Attach map(s), satellite image(s) or aerial photograph(s) detailing location of premises in relation to surrounding community.

Figure 1: Aerial View of Factory in Hout Bay

4 NATURE OF PROCESS

4.1 Process description

Please provide a detailed description of the entire production process including reference to the overall balance sheet of inputs, outputs and emissions at the site of the works.

Raw Material Caught

The pelagic fishing industry catches two main fish species namely anchovy and red-eye. The fish is mainly caught by a fleet of purse seine vessels. The fish is caught between the Orange River, north of the west coast, and the Gansbaai area on the western Agulhas Bank. The vessels use a purse seine net to catch the fish in the upper layers of the sea. The size of the shoals that are caught can vary up to 200 to 300 tons. Most of the vessels have to shoot the nets more than once to catch the full capacity or allowed quantity of fish.

The capacity of the vessels range typically between 50 and 450 tons of fish. The fish is stored in the holds of the vessels, and once fish are caught, the vessels steam back to the factory.

Offloading and Storage

The fish is pumped from the vessel via pipes and conveyors to the fish storage pits. Prior to weighing, the fish is dewatered. The blood water collected passes through a rotating screen to remove the solids and is then pumped to the blood water tank. The fish is stored in concrete fish holding pits prior to processing. The pits are fully enclosed in order to minimise the exposure of the fish to sunlight which reduces the rate of decomposition of the fish.

Fishmeal Reduction Process

The process used includes the following unit operations - cooking, solid-liquid separation, solid-liquid-liquid- separators, liquid-liquid separators, steam driers, waste heat evaporator plant, and boilers.

Cooker

The fish is transported via screw conveyors from the fish storage pits into a hopper, fish is cooked with the aid of a steam jacketed cooker. The cooker has a screw rotor that transports the fish from the inlet to the outlet of the cooker. The rotor is also steam heated and cooking is effected indirectly by conduction. During the cooking of the fish, the fat is liberated together with water soluble protein.

Phase separation

The decanters separate the solids and liquids. The decanted solids are transported via screw conveyors to the indirect steam dryers. The decanted liquid is pumped to Three-phase separators where the oil and water phase are separated. The fish oil from this process is then pumped through polishers to remove the excess water. The oil is stored in oil-storage tanks, ready for collection. The water, known as stick water is pumped to a holding tank.

Stick Water Evaporation

The water portion of the liquor, known as stick water, contains dissolved material and fine solids in suspensions which may amount to about between 9- 18% by weight. The solids are mostly protein. The material is recovered by evaporating the stick water to thick syrup containing 25-35% solids using the three stage waste heat evaporator.

Waste Heat from the dryers is the heating medium in the WHE (Waste Heat Evaporator) Falling Film Evaporation plant. Stick-water is recycled through this system in order to let the water evaporate. The final denser product (~ 35%), called the concentrate, is then added to the screw conveyor feeding the dryer to increase the final product's protein levels.

Drying

The decanter and tricanter solids stream is fed into two steam dryers in parallel, the outlet streams are combined and fed into one steam dryer in series. The concentrated liquor from the stick water evaporation section is also fed with the decanter solids into the dryers. The feed to the first drying stage usually has moisture content between 45 to 60% and should have an exit moisture content of about 20% to 30%. The moisture content of the fishmeal in the exit stream of the third dryer should have about 10%. The outlet of the third drier is then fed to screw conveyors which to a hoper where EQ then the mean is fed to five hammer mills which ensure the meal mixes properly with the EQ and the meal is of the same size.

The heat source for the driers is steam from the steam from the boilers. The meal does not reach the temperature of the steam, because rapid evaporation of water from the surface of the each particle of fish causes cooling; normally the product temperature remains at about $100^{o}C$.

Treatment of vapour from Dryers and other Plant Machines

Seawater Scrubber

The vapour and gasses the plant machines and the steam driers are channelled to the seawater scrubbers. Sea water is sprayed at the top of the scrubber, while the vapours are ducted in at the bottom.

Chemical Scrubbers

The exit gas from the seawater scrubber is divided into two gas ducts and channelled to the high efficiency chemical scrubber and two small chemical scrubbers in parallel. The exit gas from the two smaller scrubbers is channelled back into the feed of the high efficiency chemical scrubber. The non-condensable gases are treated by adding oxidizing agents to the three chemical scrubbers. The high efficiency chemical scrubber releases the treated gasses via a 21 metre high stack into the atmosphere.

Bagging and Storage

The dried meal from the third dryer with an (8 – 10) % moisture content, an antioxidant is added to the dried meal then it is conveyed to the Fishmeal Bagging Plant where the dried meal (final product) are bagged into 1 ton bulk bags (or 50 kg bags depending on customer demand) ready for transportation to the end-user. Storage of end product is done inside warehouses where it is block stacked.

Fish Oil Loading Process and Storage Tanks

The fish oil that exits Tricanters and separators is polished and then stored in the storage tanks.

4.2 Listed activities

List all Listed Activities, as published in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), proposed to be conducted at the premises in terms of this application:

Listed Activity Number	Category of Listed Activity	Sub-category of the Listed Activity	Name of the Listed Activity	Description of the Listed Activity
1	10	N/A	Animal Matter Processing	Processing of the rendering cooking, drying, dehydrating, digesting, evaporation or protein concentration of any animal matter not intended for human consumption

Despite the repeal of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), list all Scheduled Process(es), as was or were set out in the Second Schedule of the repealed Atmospheric Pollution Prevention Act, 1965, currently conducted at the premises:

APPA Registration Certificate Number	Date of Registration Certificate	Scheduled Process Number	Scheduled Process Description
1625	02 Jan 1999	69	Animal matter reduction processes

4.3 Unit process

List all unit processes associated with the listed activities in operation at the premises by the atmospheric emission licence holder, highlighting unit processes proposed in respect of this application:

Unit Process	Unit Process Function	Batch or Continuous Process
Storage	Storage facility of raw fish	Continuous
Cooking	Raw fish cooked	Continuous
Separation	Dewatering of cooked fish	Continuous
Drying	Drying of cooked fish to fishmeal	Continuous
Dry Milling	Size reduction to fishmeal	Continuous
Packing	Packing of fishmeal	Continuous
Oil Separation	Separation of press water into stickwater and oil	Continuous
Evaporation	Concentration of stickwater	Continuous
Condensing	Condensing of vapour	Continuous
HFO Boilers	Steam generation	Continuous

***Unit process** means a single component (equipment) with identifiable inputs and outputs within a process flow. A series of unit processes make up the full manufacturing process, for example, boiler, furnace, distillation column, etc.
Please provide any other unit processes currently conducted at the site of works.

Name of the Unit Process	Description of the Unit Process

4.4 Hours of operation

Provide the hours of operation of all unit processes associated with the listed activities in operation at the premises by the atmospheric emission licence holder, highlighting unit processes proposed in respect of this application:

Unit Process	Operating Hours	Number of Days Operated per Year
Storage	00h00-24h00	365
Cooking	00h00-24h00	365
Separation	00h00-24h00	365
Drying	00h00-24h00	365
Dry Milling	00h00-24h00	365
Packing	00h00-24h00	365
Oil Separation	00h00-24h00	365
Evaporation	00h00-24h00	365
Condensing	00h00-24h00	365
HFO Boilers	00h00-24h00	365

4.5 Graphical process information

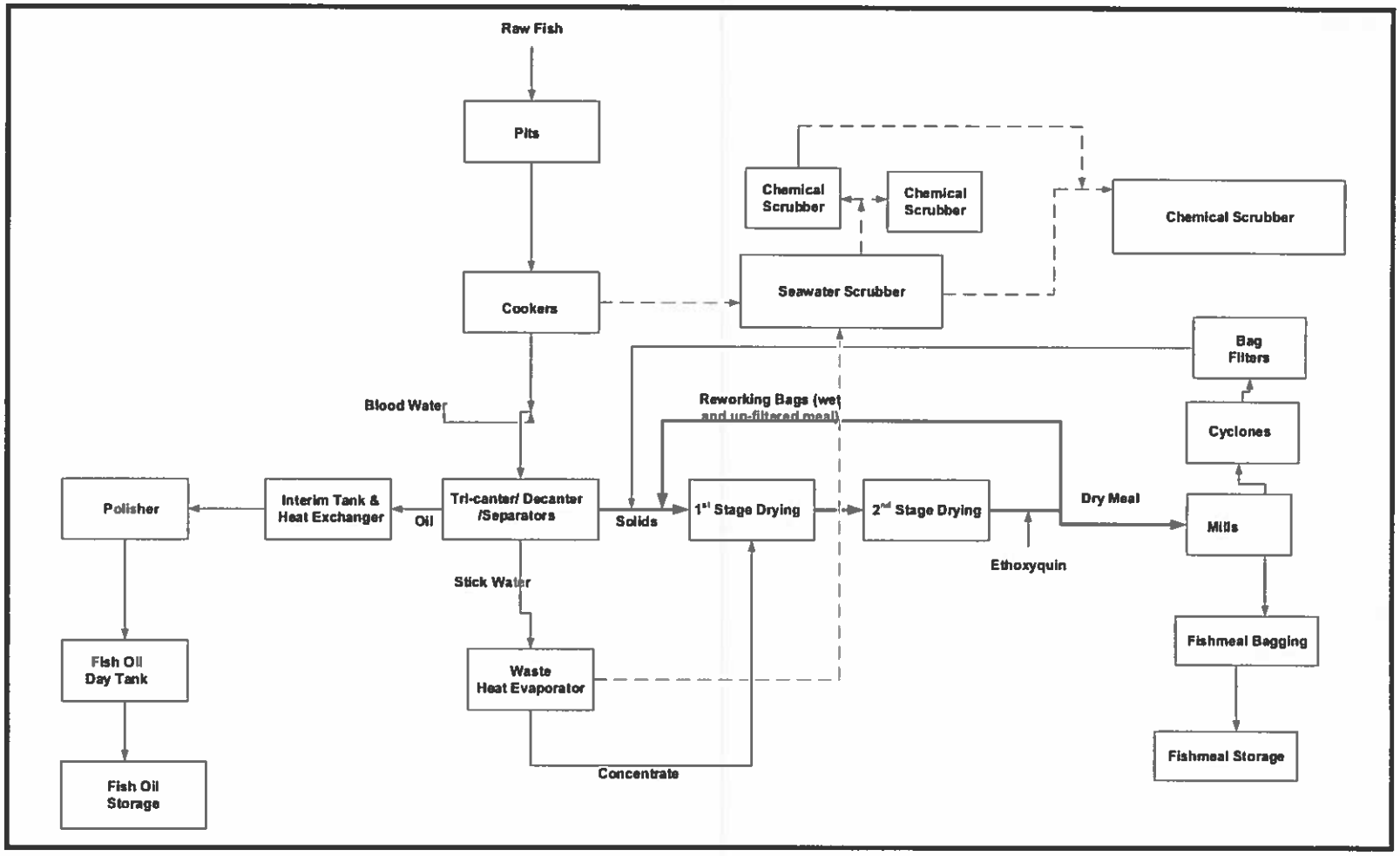
Attach the following for the entire operation being undertaken at the site of the works:

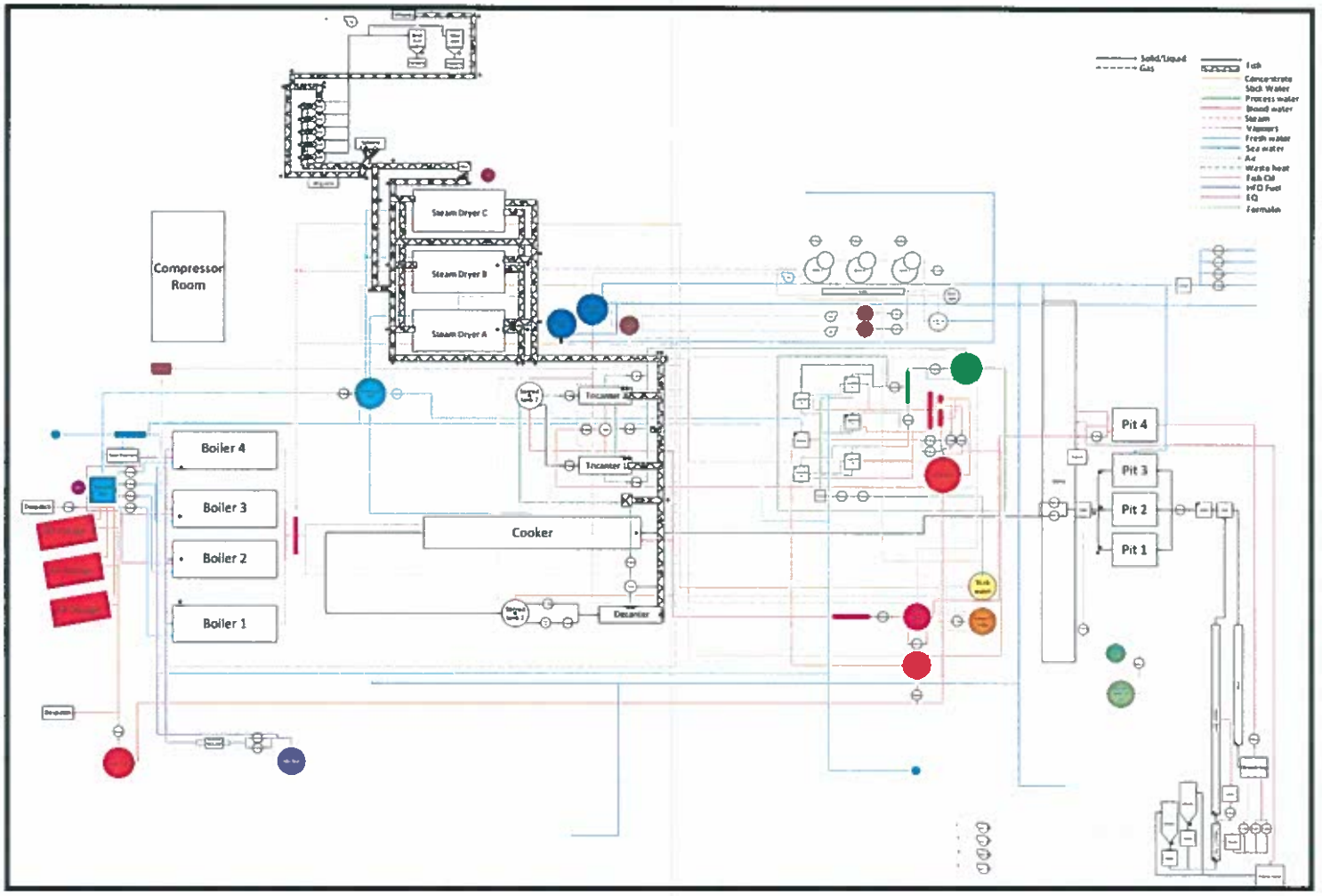
Simplified block diagram with the name of each unit process in a block; showing links between all unit processes or blocks.

Process flow chart(s) clearly indicating inputs, outputs and emissions at the site of works, including points of potential fugitive emissions and emergency releases.

Site layout diagram (plan view and to scale) indicating location of unit processes, plants, buildings, stacks, stockpiles and roads (include true north arrow and scale).

NB: Indicate clearly on the above graphics the listed activity or activities applied for in this application. Alternatively, provide additional graphics for the listed activity or activities applied for.


Raw Fish
Pits
Chemical Scrubber
Chemical Scrubber
Chemical Scrubber
Cookers
Seawater Scrubber
Bag Filters
Blood Water
Reworking Bags (wet and un-filtered meal)
Cyclones
Polisher
Interim Tank & Heat Exchanger
Oil
Tri-canter/ Decanter /Separators
Solids
1st Stage Drying
2nd Stage Drying
Dry Meal
Mills
Ethoxyquin
Stick Water
Fish Oil Day Tank
Waste Heat Evaporator
Fishmeal Bagging
Fishmeal Storage
Fish Oil Storage
Concentrate


Compressor Room
Steam Dryer C
Steam Dryer B
Steam Dryer A
Boiler 4
Boiler 3
Boiler 2
Boiler 1
Cooker
Pit 4
Pit 3
Pit 2
Pit 1


Lucky Star Hout Bay
Google Earth

5 RAW MATERIALS AND PRODUCTS

Provide raw material information, production and by-production rates and emissions information.

5.1 Raw materials used

Raw Material Type	Maximum Permitted Consumption Rate (Quantity)	Design Consumption Rate (Quantity)	Actual Consumption Rate (Quantity)	Units (Quantity/Period)
Industrial fish processing	55	35	35	Ton/hour
Formaldehyde	193[1]	122	122	Litres/hour
Antioxidant	1000 ppm	1000 ppm	600 to 800 ppm	Litres/hour (1/2lr per ton)

5.2 Production rates

Production Name	Maximum Production Capacity Permitted (Quantity)	Design Production Capacity (Quantity)	Actual Production Capacity (Quantity)	Units (Quantity/Period)
Fishmeal	18	11.96	8	Ton/hour
Fish oil	1.93	1.93[2]	1.44	Ton/hour

[1] Formaldehyde worked out at 55 tons/hr. at a dosing rate of 3.5 liters/ton of fish.
[2] Average 1.5-3.5% oil yield from history

5.3 Materials used in energy sources

The applicant must specify the materials used in energy sources, namely, coal, oil, gas or wood.

Materials for Energy	Sulphur Content of the Material (%)	Ash Content of Material (%)	Maximum Permitted Consumption Rate (Quantity)	Design Consumption Rate (Quantity)	Actual Consumption Rate (Quantity)	Units (Quantity/ Period)
Electricity	N/A	N/A	N/A	2000	2000	kW
Boiler Fuel Oil	2.0%	N/A	N/A	3500	2400	l/hr

5.4 Sources of atmospheric emission (including all tiers of greenhouse gas)

Provide emissions averaging periods that correspond to the averaging periods as set out in the national ambient air quality standards published under Government Notice No. 1210, Gazette No. 32816 dated 24 December 2009, and/or the minimum averaging periods of the relevant pollutant in relation to its health impact.

5.4.1 Point source parameters

Unique Stack ID	Source Name	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of Release Above Ground (m)	Height Above Nearby Building (m)	Diameter at Stack Tip / Vent Exit (m)	Actual Gas Exit Temperature (℃)	Actual Gas Volumetric Flow (m^3/hr)	Actual Gas Exit Velocity (m/s)
1	HFO Boiler 1	34.112778	18.530833	17	7	1.1	230	15 312	5.7
2	HFO Boiler 2	34.114167	18.530278	17	7	1.1	230	15 312	5.7
3	HFO Boiler 3	34.11333	18.530000	17	7	1.1	230	15 312	5.7
4	HFO Boiler 4	34.113889	18.530833	22	12	1.1	230	15 312	5.7
5	Scrubber 2	34.0530556	18.3455556	21	6	1.0	30	12 538.29	4.1

***Point source** means a single identifiable source and fixed location of atmospheric pollution, e.g. stack, chimney, etc.

5.4.2 Point Source Emissions

Provide emission values as being measured under normal conditions of 273 K, 101. 3 kPa, specific oxygen percentage and dry gas.

As per 5.4.1 ID	Pollutant Name	Maximum Release Rate					Emissions Hours	Type of Emissions (Continuous / Routine but Intermittent / Emergency Only)
		(mg/Nm³)	(mg/Am³)	g/s	Averaging period	Tons per annum		
1,2,3,4	CO	7		0.0090	365	0.43	24 hours/day	Continuous
1,2,3,4	O_2	2		0.0316	365	1.99	24 hours/day	Continuous
1,2,3,4	NO_X	339		1.5280	365	93.53	24 hours/day	Continuous
1,2,3,4	NO	339		1.5280	365	77.76	24 hours/day	Continuous
1,2,3,4	SO_2	1507		6.7928	365	328.08	24 hours/day	Continuous
1,2,3,4	TPM	130		0.5860	365	26.79	24 hours/day	Continuous
1,2,3,4	Ammonia	13.00		0.0586	365	3.55	24 hours/day	Continuous
1,2,3,4	Amines	<3.25		<0.0146	365	<0.8941	24 hours/day	Continuous
1,2,3,4	Mercaptans	<2.28		<0.0103	365	<0.6269	24 hours/day	Continuous
1,2,3,4	Fatty Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Methyl Mercaptan	<1.30		<0.0059	365	<0.3582	24 hours/day	Continuous
1,2,3,4	Ethyl Mercaptan	<1.63		<0.0073	365	<0.4478	24 hours/day	Continuous
1,2,3,4	Propyl Mercaptan	<2.28		<0.0103	365	<0.6269	24 hours/day	Continuous

As per 5.4.1 ID	Pollutant Name	Maximum Release Rate					Emissions Hours	Type of Emissions (Continuous / Routine but Intermittent / Emergency Only)
		(mg/Nm³)	(mg/Am³)	g/s	Averaging period	Tons per annum		
1,2,3,4	Butyl Mercaptan	<2.28		<0.0103	365	<0.6269	24 hours/day	Continuous
1,2,3,4	Formic Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Acetic Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Acrylic Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Propionic Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Isobutyric Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Butyric Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Isovaleric Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Valeric Acid	<0.03		<0.0001	365	<0.0085	24 hours/day	Continuous
1,2,3,4	Methyl Amine	<3.25		<0.0146	365	<0.8941	24 hours/day	Continuous
1,2,3,4	Dimethyl Amine	<3.25		<0.0146	365	<0.8941	24 hours/day	Continuous
1,2,3,4	Trimethyl Amine	<3.25		<0.0146	365	<0.8941	24 hours/day	Continuous
1,2,3,4	Butyl Amine	<3.25		<0.0146	365	<0.8941	24 hours/day	Continuous
5	Hydrogen Sulphide (H_2S)	4.3		0.009989	365	0.31503	24 hours/day	Continuous

As per 5.4.1 ID	Pollutant Name	Maximum Release Rate					Emissions Hours	Type of Emissions (Continuous / Routine but Intermittent / Emergency Only)
		(mg/Nm³)	(mg/Am³)	g/s	Averaging period	Tons per annum		
5	Ammonia	5		0.011616	365	0.36631	24 hours/day	Continuous
5	Amines	<2.07		<0.004809	365	<0.15165	24 hours/day	Continuous
5	Mercaptans	<1.45		<0.003369	365	<0.10623	24 hours/day	Continuous
5	Fatty Acid	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous
5	Methyl Mercaptan	<0.83		<0.001928	365	<0.06081	24 hours/day	Continuous
5	Ethyl Mercaptan	<1.04		<0.002416	365	<0.07619	24 hours/day	Continuous
5	Propyl Mercaptan	<1.45		<0.003369	365	<0.10623	24 hours/day	Continuous
5	Butyl Mercaptan	<1.45		<0.003369	365	<0.10623	24 hours/day	Continuous
5	Formic Acid	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous
5	Acetic Acid	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous
5	Acrylic Acid	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous
5	Propionic Acid	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous
5	Isobutyric Acid	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous
5	Butyric Acid	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous
5	Isovaleric	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous

As per 5.4.1 ID	Pollutant Name	Maximum Release Rate					Emissions Hours	Type of Emissions (Continuous / Routine but Intermittent / Emergency Only)
		(mg/Nm³)	(mg/Am³)	g/s	Averaging period	Tons per annum		
	Acid							
5	Valeric Acid	<0.02		<4.65E-05	365	<0.00147	24 hours/day	Continuous
5	Methyl Amine	<2.07		<0.004809	365	<0.15165	24 hours/day	Continuous
5	Dimethyl Amine	<2.07		<0.004809	365	<0.15165	24 hours/day	Continuous
5	Trimethyl Amine	<2.07		<0.004809	365	<0.15165	24 hours/day	Continuous
5	Butyl Amine	<2.07		<0.004809	365	<0.15165	24 hours/day	Continuous

5.4.3 Point source current emissions monitoring

Provide information on emission monitoring requirements.

As per 5.4.1 ID	Emission Sampling / Monitoring Method	Sampling Frequency	Sampling Duration	Measured Parameters
1,2,3,4	As prescribed in Annexure A of notice 831 dated 1 November 2013	Annually	3 Sampling runs each with minimum duration of 60 minutes	Particulate Matter (PM)
1,2,3,4	As prescribed in Annexure A of notice 831 dated 1 November 2013	Annually	3 Sampling runs each with minimum duration of 60 minutes	Sulphur Dioxide (SO_2)
5,6	As prescribed in Annexure A of notice 893 dated 22 November 2013	Annually	3 Sampling runs each with minimum duration of 60 minutes	Hydrogen Sulphide (H_2S)

5.4.4 Point source emission estimation information

As per 5.4.1 ID	Basis for Emission Rates
1,2,3,4,5	1.1. VOLUMETRIC FLOW RATE The gas velocity was calculated from data obtained from multi-point velocity pressure measurements. The location of the sampling points is based on the assumption that the distribution of gas velocity in sections of the stack cross-sectional area adjacent to the wall will approximate the $^1/_7{}^{th}$ power law curve. Velocity pressure measurements were then taken by means of an S-type pitot tube and inclined gauge manometer. Stack gas volumes was calculated from the individual point velocities and area of the stack 1.2 TOTAL PARTICULATE EMISSION RATE Solids emission rates were obtained by means of an isokinetic sampling, in accordance with a method accepted by the Department

As per 5.4.1 ID	Basis for Emission Rates
	of Environmental Affairs, DDA engineers, an independent service provider was conducted sampling using a **USEPA method 17.** Samples of stack gas are collected at various points across the stack diameters, and samples are collected at various points via maintaining the sampling flow rate at the collecting nozzle the same as the velocity of the gases at each traverse point Each isokinetic sampling train consisted of the following components: • Sampling probe, nozzle and filter holder with high efficiency filter (thimble) • Impinger set for the removal of water vapour. • Vacuum pump. • Control console fitted with calibrated orifice, thermocouple, manometer, vacuum gauge and a dry gas meter. The required isokinetic-sampling rate at each selected representative sampling point was determined by means of a programmable calculator using the measured data at that point. 1.3 STACK GAS TEMPERATURE The gas temperature was measured by means of a Type-K thermocouple connected to a digital thermometer. 1.4 STACK GAS VELOCITY The gas velocity was calculated from data obtained via multi-point velocity pressure measurements. The location of the sampling points is based on the assumption that the distribution of gas velocity in sections of the stack cross sectional area adjacent to the wall will approximate the 1/7th power law curve. Velocity pressure measurements were performed by means of an S-type pitot tube and inclined gauge manometer. Stack gas volumes were calculated from the individual point velocities and internal dimensions of the stack. 1.5 WATER VAPOUR CONTENT The water vapour content of the gas stream was calculated from the temperature of the gas leaving the condenser unit and the mass of water condensed during each test. 1.6 GAS CONCENTRATION MEASUREMENTS An ECOM Plus portable emissions' analyser was used to measure the concentrations of combustion gases (O_2, CO, NO, NOx and SO_2) in the stack gas streams on a volume/volume basis, in accordance with the EN 50379-2:2004-specification for portable electrical apparatus designed to measure combustion flue gas parameters from heating appliances.

As per 5.4.1 ID	Basis for Emission Rates
	1.7 H_2S MEASUREMENTS H2S MEASUREMNTS were carried out in accordance with the USEPA method 11, the process samples were collected with a cadmium sulphate (CdSO4) solution via a sampling train that considered of a sampling probe, five impingers in series, and a precision sampling pump. The first impringer was filled with 15 ml of hydrogen peroxide to remove any sulphur dioxide present. The second impringer was empty and the last the imprigers were each filled with 15 ml of CdSO4 solution. Three samples were collected and were sent to a SANAS accredited laboratory for analysis. 1.8. Ammonia The NH3 emissions were obtained by means of ESC C-5000 Source Sampling System, in accordance with **USEPA CTM-027** "*Determination of Ammonia Emissions from Stationary Sources*". A stack gas sample was withdrawn and collected at actual stack temperature to minimize either negative or positive reactions that would bias the ammonia results. The drawn samples were then pass through an in-stack filter and are collected in impingers containing sulfuric acid solution. Collected sample were analyzed in a SANAS accredited laboratory using ion chromatography. The sampling train for Ammonia sampling consisted of the following components: • Heated glass liner sampling probe, • Heated filter holder compartment, • Glass nozzle, • Impinger set, • Vacuum pump, • Control console fitted with calibrated orifice, thermocouple, vacuum gauge, manometer and a dry gas meter. 1.9. Amines, Fatty Acids and Mercaptans The Amine, Fatty Acids and Mercaptans were measured using **EN 13649** Method. This method is a general method for the determination of the mass concentration of individual gaseous organic compounds by adsorption onto Silica gel for Amines and

As per 5.4.1 ID	Basis for Emission Rates
	Fatty acids and Treated Filters for Mercaptans. Samples were drawn with precision pump and passed through a drier consisting of calcium chloride before been absorbed onto the sorbent tubes. Three samples were collected at each stack. The collected samples and a blank sample were sent to a SANAS accredited laboratory for analysis. Both the front and back end of the tubes were analysed.

5.4.5 Area and/or line source parameters

Unique Area Source ID	Source Name	Source Description	Latitude (decimal degrees) of SW corner	Longitude (decimal degrees) of SW corner	Height of Release Above Ground (m)	Length of Area (m)	Width of Area (m)	Angle of Rotation from True North (°)
7	Roof	Fishmeal plant building	34.110278	18.501944	10	60	60	
8	Warehouse	Bagging and Storage	34.110278	18.530833	10	100	60	

*__Area source__ means air pollution source from a specified area, e.g., pollution from a landfill site, fugitive dust from a process.
*__Line source__ means a moving source of pollutants, e.g., motor vehicles.

5.4.6 Area and/or line source emissions

As per 5.4.5 ID	Pollutant Name	Maximum Release Rate (quantity per period)	Average Annual Release Rate (quantity per period)	Emission Hours	Type of Emission (Continuous / Intermittent)	
7	H_2S	0.7		24 hours/day	Intermittent	NO
7	Ammonia	3.9		24 hours/day	Intermittent	NO
7	Amines	<0.3		24 hours/day	Intermittent	NO
7	Mercaptans	0.23		24 hours/day	Intermittent	NO
7	Fatty Acid	0.1		24 hours/day	Intermittent	NO

5.4.7 Area and/or line source – management and mitigation measures

Provide information on management and mitigation measures.

As per 5.4.5 ID	Description of Specific Measures	Timeframe for Implementation of Specific Measures	Method of Monitoring Measure Effectiveness	Contingency Measure
7	Maintain odour abatement system	Completed	Continuous online H_2S monitoring system	Three chemical scrubbers in place.
8	Fishmeal stores inside building maintain cyclones and bag filters for removal of fishmeal dust.	Completed	Cyclones fans are operational and no blockage of bag filters. Housekeeping and daily inspections	Two sets of cyclones and bag filters in place.
8	Fishmeal storage inside warehouse building	Completed	Housekeeping and daily inspections	Several warehouses and off site warehouses
8	Fishmeal loading bays under roof	Completed	Housekeeping and daily inspections	Two loading bays and an offsite loading facility

5.4.8 Area and/or line source emission estimation information

<table>
<tr><th>As per 5.4.5 ID</th><th>Basis for Emission Rates</th></tr>
<tr><td></td><td>
Ambient Sampling 3.2
Amines, Mercaptans, Hydrogen Sulphide, Fatty Acids, and Ammonia were sampled using adsorbent tubes in accordance with NIOSH methods. The method numbers are depicted in the table below. One sampling tube was utilised for each compound at each location. The collected samples were analysed in SANAS accredited laboratory.

<table>
<tr><th>compound</th><th>Absorbent Tubes</th><th>NIOSH Method</th></tr>
<tr><td>Amines</td><td>Silica Gel Tube</td><td>2010</td></tr>
<tr><td>Fatty Acids</td><td>Silica Gel Tube</td><td>2010</td></tr>
<tr><td>Mercaptans</td><td>Treated Filters</td><td>2542</td></tr>
<tr><td>NH_3</td><td>Treated Silica Tubes</td><td>6015</td></tr>
<tr><td>H_2S</td><td>Standard Charcoal Tube</td><td>1013</td></tr>
</table>
NB: The entire sampling duration, the fishmeal plant was at full production capacity and under normal operating conditions
</td></tr>
</table>

6 APPLIANCES AND MEASURES TO PREVENT AIR POLLUTION

6.1 Appliances and control measures

Provide information on appliances and measures implemented to prevent air pollution for the entire operation at the site of the works, highlighting information for listed activity or activities proposed in respect of this application.

Appliances				Abatement Equipment Control Technology							
Associated Unique Stack ID	Appliance / Process Equipment Number	Appliance Type / Description	Appliance Serial Number	Abatement Equipment Manufacture Date	Abatement Equipment Name and Model	Abatement Equipment Technology Type	Commission Date	Date of Significant Modification / Upgrade	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
SV6	Conveyors	Fishmeal plant conveyors	Unknown	2011	Water Scrubber	Seawater condenser	2011		40 000 m^3/hr.	98%	96%
				2011	Chemical Scrubber	Scrubber	2011		15 000 m^3/hr.		
				2017	Chemical Scrubber	Scrubber	2017		12 538.29 m^3/hr.		
SV6	Cooker	Fish cooker	111043	2011	Water Scrubber	Seawater condenser	2011		40 000 m^3/hr.	98%	96%
				2011	Chemical Scrubber	Scrubber	2011		15 000m^3/hr.		
				2017	Chemical Scrubber	Scrubber	2017		12 539 m^3/hr.		
SV6	Tricanter1	Centrifugal Separator	8007-502	2011	Water Scrubber	Seawater condenser	2011		40 000 m^3/hr.	98%	96%
	Tricanter 2		8007-061	2011	Chemical Scrubber	Scrubber	2011		15 000 m^3/hr.		
				2017	Chemical	Scrubber	2017		12 538.29		

Appliances				Abatement Equipment Control Technology							
Associated Unique Stack ID	Appliance / Process Equipment Number	Appliance Type / Description	Appliance Serial Number	Abatement Equipment Manufacture Date	Abatement Equipment Name and Model	Abatement Equipment Technology Type	Commission Date	Date of Significant Modification / Upgrade	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
					Scrubber				m^3/hr.		
SV6	Decanter	Centrifugal	154952/1	2011	Water Scrubber	Seawater condenser	2011		40 000 m^3/hr.	96%	98%
				2011	Chemical Scrubber	Scrubber	2011		15 000 m^3/hr.		
				2017	Chemical Scrubber	Scrubber	2017		12 538.29 m^3/hr.		
SV6	Steam Drier 1	John Thompson Rotor Disc Drier	Unknown	2002, 2007 & 2007	Waste Heat Evaporator	Evaporation	2002, 2007 & 2007		80 000 kg/hr.	96%	98%
				2011	Water Scrubber	Seawater condenser	2011		40 000 m^3/hr.	96%	98%
	Steam Drier 2			2011	Chemical Scrubber	Scrubber	2011		15 000 m^3/hr.	96%	98%
				2017	Chemical Scrubber	Scrubber	2017		12 538.29 m^3/hr.	96%	98%
SV6	Evaporator 1	Atlas Stordt Rising Film Shell Tube Heat Exchanger	3669	2011	Seawater condenser	Seawater condenser	2011		40 000 m^3/hr.	96%	98%
	Evaporator 2		4092	2011	Scrubber	Scrubber	2011		15 000 m^3/hr.	96%	98%
	Evaporator 3		4093	2017	Scrubber	Scrubber	2017		12 538.29 m^3/hr.	96%	98%

Appliances				Abatement Equipment Control Technology							
Associated Unique Stack ID	Appliance / Process Equipment Number	Appliance Type / Description	Appliance Serial Number	Abatement Equipment Manufacture Date	Abatement Equipment Name and Model	Abatement Equipment Technology Type	Commission Date	Date of Significant Modification / Upgrade	Design Capacity	Minimum Control Efficiency (%)	Minimum Utilization (%)
	Centrifuge 1	Centrifugal Separators	1631757	Not Applicable							
	Centrifuge 2		4131524								
	Centrifuge 3		4131859								
	Centrifuge 4		1718847								
	Oil Polisher	Centrifugal Polisher	Unknown	Not Applicable							
8	Hammer Mills 1-5	Enterprise Rotary Hammer Mills	Unknown	2002	Bag filters and Cyclones	Separation	2002		Unknown	96%	98%
8	Pneumatic Conveying system	Meal Conveyor	Unknown	2002	Bag filters and Cyclones	Separation	2002		Unknown	96%	98%

Start-up, maintenance and shut-down conditions

List potential start up, maintenance, shut down, upset conditions and associated responses related to the operations at the site of the works, highlight possible releases and responses for the proposed listed activity or activities in respect of the current application.

Unit Process	Description of Occurrence of Potential Releases	Pollutants and associated amount of emissions	Briefly Outline Back Up Plan
All Equipment	Service Interruptions (Power & Water)	Possible release of Hydrogen sulphide, Ammonia; Amines; Mercaptans	Stop vessels from further catching fish. Process fish as fast as possible. Inform authorities of possible bad odour.
All Equipment	Mechanical or electrical breakdown Plant & Vessels	Possible release of Hydrogen sulphide, Ammonia; Amines; Mercaptans	Stop vessels from further catching fish. Process fish as fast as possible. Inform authorities of possible bad odour.
All Equipment	Illegal Strike (inclusive of Riots and road blockages)	Possible release of Hydrogen sulphide, Ammonia; Amines; Mercaptans	Stop vessels from further catching fish. Process fish as fast as possible. Inform authorities of possible bad odour.
All Equipment	Vessel breakdown	Possible release of Hydrogen sulphide, Ammonia; Amines; Mercaptans	Direct vessel to closest plant if possible. Process fish as fast as possible. Inform authorities of possible bad odour.

6.2 Complaints register

Is a complaints register maintained at the site works?

X	Yes	A complaint's register is maintained at Lucky Star Hout Bay premises. An annual report in a stipulated format is submitted to the licensing authority.
	No	
	To be initiated, by date:	

Please provide a copy of complaints received and corrective actions taken over the past two years.

7. DISPOSAL OF WASTE AND EFFLUENTS ARISING FROM ABATEMENT EQUIPMENT CONTROL TECHNOLOGY

Provide the following information for any waste and effluent arising from abatement equipment control technology that are currently in place at the site of the works:

Unique Stack or Area ID (As per 5.4.1 or 5.4.5 above)	Waste / Effluent Type	Hazardous Components Present	Method of Disposal
5	Sea water and condensate	None	Back to the sea
8	Solid fishmeal particles	None	Bagged as a product